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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IFW
AF/18
1763

In application of:

Trung T. Doan

Serial No.: 09/652,713

Filed: August 31, 2000

For: CHEMICAL DISPENSING SYSTEM FOR
SEMICONDUCTOR WAFER PROCESSING

§
§ Group Art Unit: 1763
§
§ Examiner: S. MacArthur
§
§ Atty. Docket: 93-0421.04
§
§
§
§
§

TRANSMITTAL OF APPEAL BRIEF AND FEE AUTHORIZATION

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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4/21/04 Date	<i>Susan Ferom</i> Signature

Enclosed herewith is Applicant's Appeal Brief, submitted in triplicate. The Commissioner is authorized to charge the appropriate fee under 37 C.F.R. §1.17(c) of \$330.00, as well as any other required fee, to Micron Technology, Inc. Deposit Account No. 13-3092, Order No. 93-0421.04. This transmittal is being submitted in duplicate.

04/23/2004 FEAHAEIA 00000080 133092 09652713
01 FC:1402 330.00 DA

Respectfully submitted,

Charles Brantley 4/21/04

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 330

Complete if Known

Application Number	09/652,713
Filing Date	August 31, 2000
First Named Inventor	Trung T. Doan
Examiner Name	S. MacArthur
Art Unit	1763
Attorney Docket No.	93-0421.04

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit card ☐ Money ☐ Other ☐ None
Order

☒ Deposit Account:

Deposit Account Number 13-3092, Order No. 93-0421.04

Deposit Account Name Micron Technology, Inc.

The Director is authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☒ Credit any overpayments
☐ Charge any additional fee(s) during the pendency of this application
☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	
SUBTOTAL (1)					(\$) 0

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	2	-20 **	=	0	X	18	=	0
Independent Claims	1	-3 **	=	0	X	86	=	0
Multiple Dependent					X		=	0

Large Entity		Small Entity		<u>Fee Description</u>
Fee Code	Fee (\$)	Fee Code	Fee (\$)	
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17 (q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 330

SUBMITTED BY

Complete (if applicable)

Name (Print/Type)	Charles Brantley	Registration No. (Attorney/Agent)	38,086	Telephone	208-368-4557
Signature	Charles Brantley	Date	4/21/4		

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Application of:

Trung T. Doan

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APPLICANT'S BRIEF ON APPEAL

Certificate of Mailing (37 C.F.R. § 1.8)

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4/21/04
Date

Susan Ferome
Signature

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APPLICANT'S BRIEF ON APPEAL

I. REAL PARTY IN INTEREST

The Applicant, Trung Doan, has assigned his interest in this application to Micron Technology, Inc.

II. RELATED APPEALS AND INTERFERENCES

On February 19, 2002, Applicant submitted a Notice of Appeal as part of the prosecution of application serial no. 09/133,989, which was filed August 14, 1998. Application '989 is the parent application to the current application under appeal. Applicant's latest act was to file a Reply Brief on 11/7/03. Applicant received an Appeal Docketing Notice mailed 2/20/04.

On February 28, 2002, Applicant submitted an Appeal Brief as part of the prosecution of application serial no. 09/652,969, which was filed August 31, 2000. Application '969 is a divisional of '989 and therefore a sibling of the current application under appeal. The Board reversed the Examiner in a decision dated 7/29/03. The Examiner mailed a Notice of Allowance on 1/7/04. Applicant paid the issue fee on 1/15/04.

III. STATUS OF THE CLAIMS

Claims 1-43 have been presented during prosecution of the application under appeal.

Claims 1-35 and 38-43 have been canceled.

Claims 36-37 are pending.

Claims 36-37 are rejected under 35 U.S.C. §112, ¶2.

Claims 36-37 are appealed.

IV. STATUS OF THE AMENDMENTS

Applicant filed no amendments subsequent to final rejection.

V. SUMMARY OF THE INVENTION

The current invention addresses a device for an edge bead. The device comprises a dispenser configured to release a chemical toward the edge bead (specification at p. 3, ln. 17-18; p. 4, ln. 14-16; FIGS. 1&2) and a splash controller around the dispenser (*id.* at p. 3, ln. 18-19; p. 4, ln. 5-6; FIGS. 1&2). The splash controller is physically unattached from the edge bead (FIGS. 1&2) and is configured to draw the chemical toward the splash controller (*id.* at p. 4, ln. 3-5, 16-18). The splash controller is also configured to generate a gas pressure around the edge bead that is lower than an ambient gas pressure (*id.* at p. 3, ln. 3-7, 16-18; FIGS. 1&2) and further configured to physically intercept the chemical (*id.* at p. 4, ln. 8-10; FIGS. 1&2). In a more limited embodiment, the splash controller is around the edge bead (*id.* at p. 4, ln. 16-18; FIG. 2).

VI. ISSUE

There is one issue for determination on appeal: whether the Examiner had the authority to determine that the claims meet the definiteness requirement of §112, ¶2, despite the Board's indication to the contrary.

VII. GROUPING

Applicant defines the following group of claims for consideration upon this appeal. This group corresponds to the issue listed above.

Group 1: claims 36-37.

VIII. ARGUMENT

Before addressing the issue directly, Applicant contends the Board will benefit from a brief summary of the prosecution history. Such a history will help demonstrate that the Examiner had the authority to reconsider the Board's decision on indefiniteness. Moreover, prosecution economy would favor the Board now finding the claims to be sufficiently definite.

Prosecution economy would further favor retaining the reversal of the Examiner's previous rejection.

A. Brief Summary of Prosecution History

Applicant appealed the Examiner's §102 rejection of claims 36-37, presenting arguments in an Appeal Brief (transmitted 4/24/02) and a Reply Brief (transmitted 6/25/02).

The Board's decision dated 11/29/03 reversed the Examiner's §102 rejection and raised a §112, ¶2 indefiniteness rejection.

On 9/26/03, Applicant submitted a Showing of Facts and Response to the Board Decision to the Examiner (hereinafter referred to as the Showing and Response) supporting the definiteness of the claims. In the event that the Showing and Response was inadvertently truncated, Applicants faxed the substance of the Showing and Response on 10/23/03.

In the Office Action dated 11/14/03, the Examiner indicated a belief that the Examiner lacked authority to reconsider the Board's decision concerning indefiniteness.

In a Response transmitted 12/11/03, Applicant argued in favor of the Examiner's authority to reconsider the Board's decision concerning indefiniteness. Applicant once again included the substance of the Showing and Response transmitted 10/23/03.

In an Advisory Action dated 12/29/03, the Examiner reiterated the belief that the Examiner lacked authority to reconsider the Board's decision concerning indefiniteness.

On 2/17/04 Applicant filed a Request for Continued Examination and a Notice of Appeal.

Curiously, the Examiner subsequently mailed an Office Action dated 3/11/04. The §112 arguments presented in that Office Action are substantially identical to the language of the Board's decision dated 11/29/03.

B. The Examiner has the authority to determine if the claims meet the definiteness requirement of §112, ¶2

The Examiner's Office Action dated 11/14/03 and Advisory Action dated 12/29/03 indicate the Examiner's belief that the Examiner lacks authority to reconsider the Board's decision concerning the indefiniteness of the claim term "splash controller." Applicant contends that the

Examiner's belief is in error. The Board itself indicates that the matter can be "reconsidered by the examiner," citing 37 C.F.R. §1.196(b) as authority. (Board Decision at p. 8.) The language from that section of the C.F.R. further supports the Board's statement and Applicant's argument. Specifically, 37 C.F.R. §1.196(b) indicates that "[a] new ground of rejection" -- such as the current Board's §112 rejection -- "shall not be considered final for purposes of judicial review." Rather, in such a circumstance, Applicant may submit "a showing of facts" and "have the matter *reconsidered by the examiner.*" (37 C.F.R. §1.196(b) (emphasis added).) Section 1.196(b) further indicates that, upon a sufficient showing of facts that were not previously made of record, the Examiner (1) is not bound by the Board's new ground of rejection; and (2) may in fact find that the new ground of rejection has been overcome. (See also 37 C.F.R. §1.198 (allowing the Examiner to reopen and reconsider cases under 37 C.F.R. §1.196).) Applicant submitted a Showing of Facts on 9/26/03. As a result, the Board and Code have expressly granted authority to the Examiner to reconsider the Board's decision concerning the indefiniteness of the term "splash controller."

As further support for the Examiner's authority to reconsider the §112 rejection, Applicant cites the prosecution history of another application that recently addressed substantially similar circumstances. In U.S. App. Ser. No. 09/305,865 (hereinafter '865), the applicants appealed the examiner's prior art rejections. (See '865's Appeal Brief transmitted 2/12/02.) The Board refrained from addressing the prior art rejections in favor of raising a new §112 indefiniteness rejection. (See '865's Appeal Decision mailed 7/23/03.) The applicants submitted a showing of facts. (See '865's Showing of Facts and Response transmitted 9/11/03.) The examiner subsequently alerted the Board that the claims satisfied §112. (See '865's Response to BPAI's Instruction, mailed 10/08/03. A copy of '865's Response to BPAI's Instruction is included in an appendix to this Appeal Brief.) The current facts are analogous in terms of the prior art rejection appealed by Applicant, the §112 indefiniteness rejection raised by the Board, and Applicant's Showing and Response. Accordingly, an analogous outcome was warranted -- the Examiner acknowledging the authority to reverse the §112 rejection.

In the Advisory Action dated 12/29/03, the Examiner indicated that the prosecution history in '865 is not binding on the present case. Applicant acknowledges that but contends '865's prosecution serves as persuasive authority for the current Examiner reconsidering the §112 rejection of the currently appealed claims.

As a result, Applicant submits that (1) the Board's statements during prosecution of this application; (2) the Code of Federal Regulations; and (3) the persuasive precedent from the prosecution of another application support the Examiner's authority to determine if the claims meet the definiteness requirement of § 112, ¶2. Accordingly, Applicant respectfully requests that the Board at least remand this application with an instruction concerning the Examiner's authority to reconsider the § 112, ¶2 issue.

C. Prosecution economy favors the Board's determination that the claims meet the definiteness requirement of § 112, ¶2

However, Applicant submits that economy and efficiency may be better served if the Board reconsiders the § 112, ¶2 issue at this point. This is especially true given the Examiner's (1) attempt to refute the Showing and Response in the Office Action dated 11/14/03 (discussed below); and (2) attempt to simply recite the Board's reasoning (with less citation to authority) in the untimely Office Action dated 3/11/14.

To that end, Applicant re-presents facts below that were not of record before the Board's decision and responds to the Board's decision dated July 29, 2003.

1. Showing of facts

Applicant acknowledges that the showing of facts "may" include affidavits or declarations. (MPEP § 1214.01.) However, in the interest of efficient prosecution, Applicant contends that the facts below are more than sufficient for the Board's determination that the claims satisfy the definiteness requirements of § 112, ¶2.

a) MERRIAM WEBSTER'S COLLEGIATE DICTIONARY (10th ed.) defines
"configure" as

to set up for operation esp. in a particular way

(*Id.* at p. 242. A copy of the relevant page of MERRIAM WEBSTER is included in an appendix to this Appeal Brief.)

b) The AMERICAN HERITAGE ELECTRONIC DICTIONARY (1992) defines
“configure” as

[t]o design, arrange, set up, or shape

(A printout of the relevant definition from the ELECTRONIC DICTIONARY is included in an appendix to this Appeal Brief.)

c) The patents listed below state as follows.

i. U.S. Pat. No. 6,311,365 by Dornier states

[w]hen, as is particularly preferred, the steam cleaning head has a delta shape with slightly rounded sides, steam pressure chambers are again arranged side by side along the edge portion and are followed radially on the inside by a suction region. This suction region is defined by a circular annular arrangement of further steam pressure chambers in the interior of which a suction region is again found.

(Dornier at col. 2, ln. 31-37.)

ii. European Pat. No. 1238766 by Caspar states

[i]t should be understood that the amount of suction applied to the suction apertures depends on the shape and size of the apertures which preferably are round.

(Caspar at ¶[0013].)

iii. U.S. Pat. No. 6,341,387 by Zars states

[a]n additional object of the present invention is that it may be installed as a "kit" on virtually any pool, whether new or existing. The invention is intended to be self-contained and made of materials familiar in the art, preferably polyvinyl chloride

(PVC) piping, The (sic) exact limiting quantity of suction is determined by the internal dimensions and arrangement of the piping and sump.

(Zars at col. 2, ln. 41-47.)

iv. U.S. Pat. No. 4,938,239 by Theurer states

[t]his advantageous combination of the compressed air discharging nozzle and the suction inlet port results in a reinforced suction air flow because the path of this flow is exactly determined by the arrangement of the nozzle within the inlet port so that all the dirt is subjected to the downward pressure of the compressed air as well as the upward suction, which will cause a strong turbulence and detach even strongly adhering dirt particles from the ballast.

(Theurer at col. 3, ln. 30-38.)

v. U.S. Pat. No. 4,522,575 by Tischer states

the discharge pressure and suction pressure are easily determined design parameters . . .

(Tischer at col. 6, ln. 14-16.)

vi. U.S. Pat. No. 3,939,065 by Einersson states

[t]he strength of the pressure and suction waves depends, besides by the design of the pulsation organs, mainly on the peripheral velocity of the drum relative to the peripheral velocity of the suspension in the liquid layers in question.

(Einersson at col. 2, ln. 41-45.)

(Copies of these patents are included in appendices to this Appeal Brief.)

2. Argument

The Board's decision dated July 29, 2003 raised a §112, ¶2 indefiniteness rejection, focusing on independent claim 36's limitations concerning a splash controller that is (1) configured to draw a chemical toward itself; and (2) configured to generate a gas pressure. The Board specifically argued that *suction* applied *through* the splash controller, rather than the *configuration* of the splash controller, is what draws the chemical and generates the gas pressure. (Board Decision at p. 4-5.) Significantly, in support for this argument, the Board interpreted the term "configured" to mean "shaped." (*Id.* at p. 4.) As authority for this interpretation, the Board cited page 242 of MERRIAM WEBSTER'S COLLEGIATE DICTIONARY (10th ed.). (Board Decision at p. 4, footnote 1.) However, as cited above in part 1(a), that reference appears to offer a different definition. Specifically, the definition of the root word "configure" indicates that "configured" means "set up for operation." Moreover, the alternate source cited above in part 1(b) indicates that the term "configured" is broad enough to encompass MERRIAM WEBSTER'S actual definition, the Board's stated definition, and more. Namely, the ELECTRONIC DICTIONARY's definition of the root word indicates that "configured" broadly means "designed, arranged, set up, or shaped."

Moreover, one of ordinary skill in the art would be aware that suction is a function of the design, arrangement, set up, or shape (i.e. configuration) of a relevant device, as demonstrated by the patents cited above in part 1(c). For example, U.S. Pat. No. 6,311,365 by Dornier teaches that a "suction region" is defined by an "arrangement" of pressure chambers. (Dornier at col. 2, ln. 35-36.) European Pat. No. 1238766 by Caspar indicates that "the amount of suction applied" depends on the "shape" of a device's apertures. (Caspar at ¶[0013].) U.S. Pat. No. 6,341,387 by Zars discloses that a "quantity of suction" is determined by the internal dimensions and "arrangement" of piping. (Zars at col. 2, ln. 45-47.) U.S. Pat. No. 4,938,239 by Theurer instructs one of ordinary skill in the art that the path of a "suction air flow" is determined by an "arrangement" of a nozzle with an inlet port. (Theurer at col. 3, ln. 32-34.) U.S. Pat. No. 4,522,575 by Tischer discloses that "suction pressure" is a "design" parameter. (Tischer at col. 6, ln. 14-16.) U.S. Pat. No. 3,939,065 by Einersson indicates that the strength and press of "suction waves" depends in part upon the "design" of pulsation devices. (Einersson at col. 2, ln. 41-43.) Applicant contends that such knowledge is deemed to be imparted to one of ordinary

skill in the art when considering the Specification's support for the definiteness of the terms at-issue.

Further, the Specification in fact provides non-limiting support for designs/arrangements/set ups/shapes of splash controllers. Applicant cited the relevant portions in part V of this Appeal Brief when summarizing the invention. To reiterate, Applicant cited p. 3, ln. 18-19; p. 4, ln. 5-6; and FIGS. 1&2 (addressing vacuum port 18) for the general disclosure of a splash controller. For the specific limitation of a splash controller configured to draw the chemical toward itself, Applicant cited p. 4, ln. 3-5, 16-18 (addressing how the design/ arrangement/set up/shape of vacuum port 18 allows application of suction to a particular area). For the specific limitation of a splash controller configured to generate the relevant gas pressure, Applicant cited p. 3, ln. 3-7, 16-18; and FIGS. 1&2. Applicant alerts the Board that p. 4, ln. 3-7, 16-18 are relevant to this limitation as well.

In addition, it is significant that the Board has acknowledged that suction draws the relevant chemical and generates the relevant gas pressure (and that the Specification discloses so). (See Board Decision at p. 5-6.)

Hence, because the Specification discloses a splash controller configured (i.e. designed, arranged, set up, or shaped) for suction; and suction draws the relevant chemical and generates the relevant gas pressure; then the Specification necessarily discloses a splash controller configured to draw the relevant chemical and generate the relevant gas pressure.

As a result, Applicant contends the claims meet §112's definiteness requirement and requests the Board so find.

As mentioned above, Applicant has previously presented these factual showings and arguments to the Examiner. In the Advisory Action dated 12/29/03, the Examiner responded by announcing that Applicant's showing of facts "do not contribute anything new." Applicants alert the Board that the showing of facts do in fact contribute something new; namely, the facts presented above in part 1(a) demonstrate that (1) the Board misquoted the dictionary it relied upon; and (2) the Board's dictionary, other dictionaries, other patents deemed to be known by one of ordinary skill in the art, and the current Specification all demonstrate the definiteness of the term "splash controller" as used in the appealed claims.

Also in an attempt to refute Applicant's showing of facts, the Examiner's Office Action dated 11/14/03 indicates the Examiner's belief that the showing of facts *must* be in accordance

with 37 CFR §1.131 or §1.132, which address the submission of affidavits or declarations. Applicant once again contends that the Examiner's belief is in error. As indicated in the Showing and Response, such affidavits or declarations are *permitted* but not required. (*See* part 1(a) above.) Applicant's argument is supported by the MPEP itself, which uses permissive language twice in the statement addressing the contribution of 37 CFR §1.131 and §1.132 to an appropriate showing of facts.

The "showing of facts" under the rule *may* be a showing under 37 CFR 1.130, 1.131 or 1.132, as *may* be appropriate.

(MPEP 1214.01(I) (emphasis added).) Thus, while the showing of facts "may" include affidavits or declarations addressed in 37 CFR §1.131 or §1.132, such is not a requirement. Applicant submits that the eight statements presented (*see* parts 1(a)-(c) above) are indeed (1) facts that (2) were not previously made of record and therefore demonstrate the completeness of Applicant's Showing and Response.

Further support for the completeness of Applicant's Showing and Response can be found by returning to Applicant's analogy to the prosecution history of '865. As mentioned above, the '865 applicants appealed the examiner's prior art rejections (*see* '865's Appeal Brief transmitted 2/12/02); and the Board refrained from addressing the prior art rejections in favor of raising a new §112 indefiniteness rejection (*see* '865's Board Decision mailed 7/23/03).

Not mentioned above is the fact that the '865 applicants' subsequent showing of facts was limited to citing dictionary and patent excerpts. (*See* '865's Showing of Facts and Response transmitted 9/11/03.) The examiner subsequently alerted the Board that the claims satisfied §112. (*See* '865's Response to BPAI's Instruction, mailed 10/08/03. A copy of '865's Response to BPAI's Instruction is included in an appendix to this Appeal Brief.) The current facts are analogous in terms of the prior art rejection appealed by Applicant, the §112 indefiniteness rejection raised by the Board, and Applicant's Showing and Response. Accordingly, an analogous outcome is warranted – the acknowledgement that the current claims satisfy the §112, ¶2 definiteness requirement.

D. Prosecution economy favors the Board's continuing reversal of the Examiner's attempted §102 rejection.

The Board's reversal of the Examiner's §102 rejection was due to the Board's raising the §112, ¶2 issue; the Board made no substantive decision concerning the claims' novelty. (Board Decision at p. 7.) Thus, in the event the Board sees fit to withdraw the §112 rejection, Applicant submits that economy and efficiency may be further served if the Board addresses the Examiner's §102 rejection as part of this Appeal. For refutation of that rejection, Applicant refers the Board to the previous Appeal Brief and Reply Brief transmitted two years ago.

E. Conclusion

The Board's statements made during prosecution of this application, the Code of Federal Regulations, and analogy to a similarly prosecuted application favor the Examiner's authority to reconsider the Board's opinion concerning indefiniteness. Moreover, the facts and arguments presented previously and above support a finding of definiteness. In addition, prosecution economy and efficiency favor the Board withdrawing the §112 rejection and addressing the §102 rejection. Still further, the arguments presented in the Appeal Brief from two years ago support the novelty of the claims, thereby favoring the Board's withdrawal of that rejection as well. Accordingly, Applicant respectfully requests that the Board reverse the Examiner, withdraw all rejections, and allow the claims. Alternatively, Applicants request that the Board remand to the Examiner with directions to reconsider the claims' definiteness in light of the facts and arguments presented previously and above rather than merely echo the Board's decision.

Respectfully submitted,

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4/21/4

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Appendix 1: Copy of Involved Claims

36. A device for an edge bead, comprising:

a dispenser configured to release a chemical toward said edge bead; and

a splash controller around said dispenser, physically unattached from said edge

bead, and configured to draw said chemical toward said splash controller, wherein

said splash controller is configured to generate a gas pressure around said edge

bead that is lower than an ambient gas pressure, and wherein said splash

controller is configured to physically intercept said chemical.

37. The device in claim 36, wherein said splash controller is around said edge bead.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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7590 10/08/2003
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EXAMINER
HU, SHOUXIANG

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 10/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

RECEIVED

#25

RESPONSE TO BPAI'S INSTRUCTION REGARDING SN 09/305,865***BPAI's Instruction***

In BPAI's ruling made on July 23, 2003 (Paper No. 24) regarding SN 09/305,865, the examiner's rejections of claims 22-36 under 35 U.S.C. 103 were reversed; new ground of rejections under the second paragraph of 35 U.S.C 112 was entered, and this application was remanded to examiner. Also in the ruling, the examiner was instructed to determine if the subject matter of claims 22 to 36 is adequately supported by the original application. More specifically, the examiner was instructed to review the specification to determine whether the insulator or insulative material as required by claims 22-36 is described as part of Appellant's invention.

Examiner's Response

After reviewing the specification, the examiner believes that the subject matter of claims 22 to 36 fairly complies with 35 U.S.C. 112, first paragraph, as explained below.

The subject matter at issue is whether the recited limitations regarding an insulating element, which is recited as "an insulation cap" in claim 22, "an insulator" in claim 25, "an insulative material" in claim 29, and "a top insulator" in claim 33, are reasonably supported by the original application. According to the original application, the device structure of the instant invention (see Fig. 3) comprises a top (or cap) layer (64) atop the gate electrode (74), wherein the top layer (64) is formed of an oxide or

nitride or a combination thereof (see page 9, lines 14-22 of the instant specification). As shown in Fig. 3, in view of the specification (particularly see page 10, lines 15-19), the top layer (64) is apparently patterned to have a width substantially same as that of the gate electrode (74) prior to the formation of the dielectric sidewall spacer (62). The lining layer 58 therein is formed through a re-oxidation process after the formation of the dielectric sidewall spacer (62). It reasonably supports the subject matter that the top layer (64) itself does not cover any of the sidewalls of the gate electrode, although the applicant uses a less definite term of "uncovering" to define such a subject matter in the amended claims.

It is true that the original application does not explicitly describe that such a top layer (64) is an insulating layer. However, the original application does explicitly specify that this top layer is formed of an oxide or nitride or a combination thereof (see page 9, lines 14-22 of the instant specification); and one of ordinary skill in the art would readily recognize that such a top layer is by natural an insulating one, since when an oxide layer is mentioned in the art, especially when mentioned together with a nitride layer, unless specified otherwise, it is normally meant to be an insulating layer (such as a gate oxide layer is a commonly recognized synonym of a gate insulator); and also since such a top layer formed atop the gate electrode is commonly formed with an insulating layer, otherwise it would be a part of the gate electrode if the top layer were not insulative, and it would then be inappropriate to call the layer (74) alone as the gate electrode. Evidence for showing that such a top layer is by natural an insulating one can be readily found in the prior art including the cited prior art references of Takeuchi (US 5,962,892;

Art Unit: 2811

see the insulating cap layer 5 in Figs. 4 and 7, also col. 7, lines 26-27 and lines 44-46) and Kim (US 5,693,549; see the insulating cap layers 24 and 34 in Figs. 4 and 5, also see col. 3, lines 21-22, col. 4, lines 22-23, and col. 6, lines 58-59).

According to MPEP § 2163.II, the analysis of whether the specification complies with the written description requirement calls for the examiner to compare the scope of the claim with the scope of the description to determine whether applicant has demonstrated possession of the claimed invention. Such a review is conducted from the standpoint of one of skill in the art at the time the application was filed (see, e.g., *Wang Labs. v. Toshiba Corp.*, 993 F.2d 858, 865, 26 USPQ2d 1767, 1774 (Fed. Cir. 1993)) and should include a determination of the field of the invention and the level of skill and knowledge in the art. Generally, there is an inverse correlation between the level of skill and knowledge in the art and the specificity of disclosure necessary to satisfy the written description requirement. Information which is well known in the art need not be described in detail in the specification. See, e.g., *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1379-80, 231 USPQ 81, 90 (Fed. Cir. 1986). In this case, based on the above analysis conducted from the standpoint of one of ordinary skill in the art at the time the application was filed, the examiner believes that the applicant has fairly demonstrated possession of the claimed subject matter of the insulating top (or cap) layer overlying the recited gate electrode. And, the original description also reasonably adequately describes how to form such an insulating top (or cap) layer.

Art Unit: 2811

Therefore, the examiner concludes that the subject matter of claims 22 to 36 fairly complies with 35 U.S.C. 112, first paragraph.

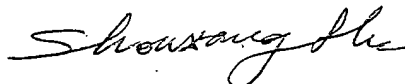
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703) 306-5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH



SHOUXIANG HU
PRIMARY EXAMINER



Merriam- Webster's Collegiate® Dictionary

TENTH EDITION

Merriam-Webster, Incorporated
Springfield, Massachusetts, U.S.A.

mind or a manner marked by easy coolness and freedom from uncertainty, diffidence, or embarrassment. CONFIDENCE stresses faith in oneself and one's powers without any suggestion of conceit or arrogance (the confidence that comes from long experience). ASSURANCE carries a stronger implication of certainty and may suggest arrogance or lack of objectivity in assessing one's own powers (handled the cross-examination with complete assurance). SELF-POSSESSION implies an ease or coolness under stress that reflects perfect self-control and command of one's powers (answered the insolent question with complete self-possession). APLOMB implies a manifest self-possession in trying or challenging situations (handled the reporters with great aplomb).

confidence *adj* (1849) : of, relating to, or adept at swindling by false promises (a ~ game) (a ~ man)

confidence interval *n* (1934) : a group of continuous or discrete adjacent values that is used to estimate a statistical parameter (as a mean or variance) and that tends to include the true value of the parameter a predetermined proportion of the time if the process of finding the group of values is repeated a number of times

confidence limits *n pl* (1939) : the end points of a confidence interval
confi-dent *adj* ('kän-fə-dent, -dnt) *adj* [L *confident-, confidens*, fr. prp. of *confidere*] (1576) 1 : characterized by assurance; esp : SELF-RELIANT 2 obs : TRUSTFUL 3 a : full of conviction; CERTAIN b : COCKSURE — **confi-dent-ly** *adv*

confi-den-tial ('kän-fə-dent(t)-shəl) *adj* (1759) 1 : marked by intimacy or willingness to confide (a ~ tone) 2 : PRIVATE, SECRET (~ information) 3 : entrusted with confidences (~ clerk) 4 : containing information whose unauthorized disclosure could be prejudicial to the national interest — compare SECRET, TOP SECRET — **confi-den-tial-ity** \-den(t)-shē-'a-lə-tē *n* — **confi-den-tial-ly** \-den(t)-sh(ə)-lē *adv*

confid-ing ('kän-'fi-dip) *adj* (1829) : tending to confide : TRUSTFUL — **confid-ing-ly** \-dip-lē *adv* — **confid-ing-ness** *n*

confi-gu-ra-tion ('kän-'fi-gyā-'rā-shən, -kän-, -gā-) *n* [LL *configuratio*, *configuratio* similar formation, fr. L *configurare* to form from or after, fr. *com-* + *figurare* to form, fr. *figura* figure] (1646) 1 a : relative arrangement of parts or elements; as (1) : SHAPE (2) : contour of land (~ of the mountains) (3) : functional arrangement (a small business computer system in its simplest ~); b : something (as a figure, contour, pattern, or apparatus) that results from a particular arrangement of parts or components c : the stable structural makeup of a chemical compound esp. with reference to the space relations of the constituent atoms 2 : GESTALT (personality ~) — **confi-gu-ra-tion-al** \-shənəl, -shə-n'əl *adj* — **confi-gu-ra-tion-al-ly** *adv* — **confi-gu-rative** \-fi-gyā-'rā-tiv, -'fi-gā- *adj*

confi-gure ('kän-'fi-gyā, esp Brit -'fi-gā) *vi* -ured; -ur-ing (1677) : to set up for operation esp. in a particular way (a fighter plane configured for the Malaysian air force)

con-fine ('kän-'fin also 'kän-'n) *n* [ME, fr. MF or L; MF *confines*, pl., fr. L *confine* border, fr. neut. of *confinis* adjacent, fr. *com-* + *finis* end] (15c) 1 pl a : something (as borders or walls) that encloses (outside the ~s of the office or hospital — W. A. Nolen); also : something that restrains (escape from the ~s of soot and clutter — E. S. Muskie) b : SCOPE 3 (work within the ~s of a small group — Frank Newman) 2 a archaic : RESTRICTION b obs : PRISON

con-fine ('kän-'fin) *vb* **con-fined**; **con-fin-ing** *vi* (1523) *archaic* : BORDER — *vt* 1 a : to hold within a location b : IMPRISON 2 : to keep within limits (will ~ my remarks to one subject) *syn* see LIMIT — **con-fin-er** *n*

con-fined ('kän-'find) *adj* (1772) : undergoing childbirth

con-fine-ment ('kän-'fin-mnt) *n* (1646) : an act of confining : the state of being confined (solitary ~); *syn* : LYING-IN

con-firm ('kän-'firm) *vi* [ME, fr. OF *confirmare*, fr. L *confirmare*, fr. *com-* + *firmare* to make firm, fr. *firmus* firm] (13c) 1 : to give approval to : RATIFY 2 : to make firm or firmer : STRENGTHEN 3 : to administer the rite of confirmation to 4 : to give new assurance of the validity of : remove doubt about by authoritative act or indisputable fact — **con-firm-abil-ity** \-fərm-'bəl-ə-tē *n* — **con-firm-able** \-fərm-'mə-bəl *adj*

syn CONFIRM, CORROBORATE, SUBSTANTIATE, VERIFY, AUTHENTICATE. VALIDATE mean to attest to the truth or validity of something. CONFIRM implies the removing of doubts by an authoritative statement or indisputable fact (confirmed the reports). CORROBORATE suggests the strengthening of what is already partly established (witnesses corroborated his story). SUBSTANTIATE implies the offering of evidence that sustains the contention (the claims have yet to be substantiated). VERIFY implies the establishing of correspondence of actual facts or details with those proposed or guessed at (all statements of fact in the article have been verified). AUTHENTICATE implies establishing genuineness by adding legal or official documents or expert opinion (handwriting experts authenticated the diaries). VALIDATE implies establishing validity by authoritative affirmation or by factual proof (validated the hypothesis by experiments).

con-fir-mand ('kän-fər-'mand) *n* [L *confirmandus*, gerundive of *confirmare*] (1884) : a candidate for religious confirmation

con-fir-ma-tion ('kän-fər-'mā-shən) *n* (14c) 1 : an act or process of confirming; as (1) : a Christian rite conferring the gift of the Holy Spirit and among Protestants full church membership (2) : a ceremony esp. of Reform Judaism confirming youths in their faith b : the ratification of an executive act by a legislative body 2 a : confirming proof : CORROBORATION b : the process of supporting a statement by evidence — **con-fir-ma-tion-al** \-shənəl, -shə-n'əl *adj*

con-fir-ma-to-ry ('kän-fər-'mā-tōr-ē, -tōr-) *adj* (1636) : serving to confirm : CORROBORATIVE

con-firmed ('kän-'fərməd) *adj* (14c) 1 a : marked by long continuance and likely to persist (a ~ habit) b : fixed in habit and unlikely to change (a ~ do-gooder) 2 : having received the rite of confirmation *syn* see INVETERATE — **con-firm-ed-ly** \-fərməd-lē *adv* — **con-firmed-ness** \-fərməd-nəs, -'fərm(d)-nəs *n*

con-fis-ca-ble ('kän-'fis-kə-bəl) *adj* (ca. 1736) : liable to confiscation

con-fis-ca-ble ('kän-'fis-kə-tə-bəl) *adj* (1863) : CONFISCABLE

con-fis-cate ('kän-'fə-skāt, -kən-'fis-kot) *adj* [L *confiscatus*, pp. of *confiscare* to confiscate, fr. *com-* + *fiscus* treasury] (ca. 1533) 1 : appro-

priated by the government : FORFEITED 2 : deprived of property by confiscation

con-fis-ca-tion ('kän-'fə-skāt) *vi* -cat-ed; -cat-ing (1552) 1 : to seize forfeited to the public treasury 2 : to seize by or as if by authority

con-fis-ca-tion ('kän-'fə-skā-shən) *n* — **con-fis-ca-tor** ('kän-'fə-skā-tər) *n* — **con-fis-ca-to-ry** ('kän-'fis-kā-tōr-ē, -tōr-) *adj*

con-fit ('kən-'fē, -kən-, -kən-) *n* [F, fr. OF, preparation, preserves, fr. *co-* of *confire* to prepare — more at COMFIT] (1951) : meat (as goose, duck, or pork) that has been cooked and preserved in its own fat

con-fi-te-or ('kən-'fē-tē-ōr, -ōr-) *n* [ME, fr. L, lit.: I confess, fr. the opening words — more at CONFESS] (13c) : a liturgical form in which sinners acknowledge and intercession for God's mercy requested

con-fi-ture ('kän-'fə-chūr, -tyūr, -tūr) *n* [F, fr. MF, fr. *confit*] (1800) : preserved or candied fruit : JAM

con-fla-grant ('kən-'flā-grant) *adj* [L *conflagrant-, conflagrans*, pp. of *conflagrare* to burn, fr. *com-* + *flagrare* to burn — more at BLACK] (ca. 1656) : BURNING, BLAZING

con-fla-gra-tion ('kän-'flā-grā-shən) *n* [L *conflagration-, conflagratio*, fr. *conflagrare*] (ca. 1656) 1 : FIRE; esp : a large disastrous fire 2 : CONFLICT, WAR

con-flate ('kän-'flāt) *vi* **con-flat-ed**; **con-flat-ing** [L *conflatus*, pp. of *conflare* to blow together, fuse, fr. *com-* + *flare* to blow — more at BLOW] (1610) 1 a : to bring together : FUSE b : CONFUSE 2 a : combine (as two readings of a text) into a composite whole

con-fla-ture ('flā-shən) *n* (15c) : BLEND, FUSION; esp : a composite reading or text

con-flict ('kän-'flikt, -flikt) *n* [ME, fr. L *conflictus* act of striking together, fr. *conflicere* to strike together, fr. *com-* + *fligere* to strike — more at PROFLIGATE] (15c) 1 : FIGHT, BATTLE, WAR 2 a : competitive or opposing action of incompatibles : antagonistic state or action (as of divergent ideas, interests, or persons) b : mental struggle resulting from incompatible or opposing needs, drives, wishes, or external internal demands 3 : the opposition of persons or forces that give rise to the dramatic action in a drama or fiction *syn* see DISCORD

con-flict-ful ('kän-'flikt-fəl) *adj* — **con-flict-tu-al** ('kän-'flikt-kə-wəl, -chəl, -shwəl) *adj*

con-flict ('kän-'flikt, -flikt) *vi* (15c) 1 *archaic* : to contend in warfare 2 : to show antagonism or irreconcilability — **con-flic-tion** ('kän-'flikt-shən, -kän-) *n* — **con-flic-tive** ('kän-'flikt-tiv, -kän-,) *adj*

con-flict-ed ('kän-'flikt-əd) *adj* (1967) : having or experiencing an emotional conflict (this unhappy ~ and modern woman — John Updike)

con-flic-tion ('kän-'flikt-shən) *n* (15c) : a coming or flowing together, meeting, or gathering at one point (a happy ~ of weather and scenery) 2 a : the flowing together of two or more streams b : the place of meeting of two streams c : the combined stream formed by conjunction

con-flu-ent ('kän-'fluent) *adj* [L *confluent-, confluens*, pp. of *confluere* to flow together, fr. *com-* + *fluere* to flow — more at FLUID] (15c) 1 : flowing or coming together; also : run together (~ pustules) 2 : characterized by confluent lesions (~ smallpox)

con-fluent ('kän-'fluent) *n* (1850) : a confluent stream; broadly : TRIBUTARY

con-flux ('kän-'flaks) *n* [ML *confluxus*, fr. L *confluere*] (1606) : CONFLUENCE

con-fo-cal ('kän-'fō-kəl) *adj* (1867) : having the same foci (~ diop- ses) (~ lenses) — **con-fo-cal-ly** \-kə-lē *adv*

con-form ('kän-'fōrm) *vb* [ME, fr. MF *conformer*, fr. L *conformare*, fr. *com-* + *formare* to form, fr. *forma* form] (14c) 1 : to give the same shape, outline, or contour to : bring into harmony or accord (~ the rows to the slope of the land) ~ *vi* 1 : to be similar or identical; also : to be in agreement or harmony — used with *to* or *with* 2 a : to be obedient or compliant — usu. used with *to* b : to act in accordance with prevailing standards or customs *syn* see ADAPT — **con-formed** *n* — **con-form-ism** \-fōrm-'mī-zəm *n* — **con-form-ist** \-mīst *n* or *ad*

con-form-able ('kän-'fōrm-'mə-bəl) *adj* (15c) 1 : corresponding in form or character : SIMILAR — usu. used with *to* 2 : SUBMISSIVE, COMPLIANT 3 : following in unbroken sequence — used of geologic strata formed under uniform conditions — **con-form-ably** \-blē *adv*

con-for-mal ('kän-'fōrm-'mə-l, -'kän-) *adj* [LL *conformalis* having the same shape, fr. L *com-* + *formalis* formal, fr. *forma*] (1893) 1 : having the size of the angle between corresponding curves unchanged (~ transformation) 2 of a map : representing small areas in their true shape

con-for-mance ('kän-'fōrm-'māns) *n* (1606) : CONFORMITY

con-for-ma-tion ('kän-'fōrm-'mā-shən, -fər-) *n* (1511) 1 : the act of conforming or producing conformity 2 : ADAPTATION 3 : formation of something by appropriate arrangement of parts or elements : an assembling into a whole (the gradual ~ of the embryo) 3 a : correspondence esp. to a model or plan b : STRUCTURE c : the shape or proportionate dimensions esp. of an animal d : any of the spatial arrangements of a molecule that can be obtained by rotation of atoms about a single bond — **con-for-ma-tion-al** \-shənəl, -shə-n'əl *adj*

con-for-mi-ty ('kän-'fōrm-'mə-tē) *n pl* -ties (15c) 1 : correspondence in form, manner, or character : AGREEMENT (behaved in ~ with her beliefs) 2 : an act or instance of conforming 3 : action in accordance with some specified standard or authority (~ to social custom)

con-found ('kän-'faund, -kän-) *vi* [ME, fr. MF *confondre*, fr. L *confundere* to pour together, confuse, fr. *com-* + *fundere* to pour — more at BATTLE] (14c) 1 a *archaic* : to bring to ruin : DESTROY b : to frustrate (conferences ~ are not for accomplishment but to ~) c : to mix up tricks — J. K. Galbraith 2 obs : CONSUME, WASTE 3 a : to put to shame : DISCOMFIT (a performance that ~ed the critics) b : REVERT (sought to ~ his arguments) 4 : DAMN 5 : to throw (a person) into confusion or perplexity 6 a : to fail to discern differences between : mix up b : to increase the confusion of *syn* see PUZZLE — **con-found-er** \-faund-'dər *n* — **con-found-ing-ly** \-dip-lē *adv*

con-found-ed ('kän-'faund-'dəd, -'dād, -'kän-, -'kän-) *adj* (14c) 1 : CONFUSED 2 : DAMNED — **con-found-ed-ly** *adv*

con-frat-er-ni-ty ('kän-'frā-'tər-nə-tē) *n* [ME *confraternite*, fr. MF *confraternité*, fr. ML *confraternitas*, fr. L *confrater* brother, fr. L

brother, fr. L society devout union

con-frere also MF, trans. of **con-front** (kə

con-front (kə

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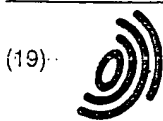
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Appendix 4: Definition from AMERICAN HERITAGE ELECTRONIC DICTIONARY (1992)

con·fig·ure (k...n-flg“y...r) *tr.v.* **con·fig·ured, con·fig·ur·ing, con·fig·ures.** To design, arrange, set up, or shape with a view to specific applications or uses: *an internal security vehicle that was configured for rough terrain.* [Middle English *configuren*, from Old French *configurer*, from Latin *conficere* : *com-*, *com-* + *ficere*, to form (from *figura*, shape; see **dheigh-** below).]



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(54) Water jet web slitting apparatus

(57) A water jet web slitting apparatus (10) slits a web (16) at a plurality of locations across the web (16) into webs (16a) of smaller width in a winder. The water jet web slitting apparatus (10) utilizes a water jet cutter (20) to slit the web (16). The water jet cutter (20) has a support plate (32) with a pattern of suction apertures (42) located surrounding the cutting aperture (38) of the water jet cutter (20) through which negative pressure is applied to hold the web (16) against the support plate (32) adjacent the water jet cutting apparatus (10) and to prevent the web (16) from fluttering or moving relative to the support plate (32) notwithstanding whether the web (16) is travelling or temporarily at a stopped position. This permits for the water jet to be run continuously without having to be turned off and restarted when the web travel is temporarily stopped and started again because the continually running jet does not re-wet the surface of the web (16) or the edges (16a) cut into the web (16).

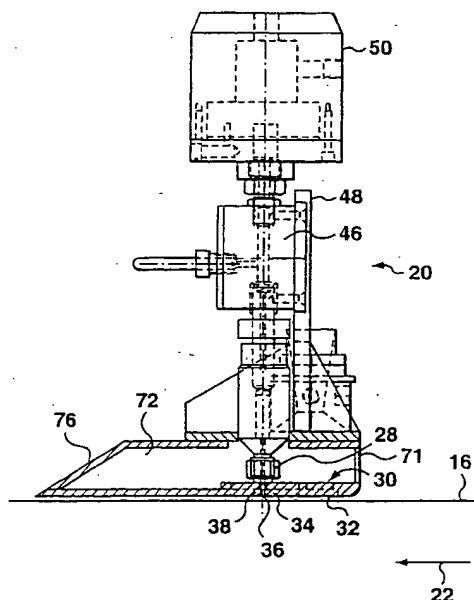


FIG. 2

EP 1 238 766 A2

Description

Field of the Invention

[0001] The present invention relates to a water jet web slitting apparatus for slitting a web normally travelling in a first direction or remaining stationary relative to the slitting apparatus. In particular it relates to a water jet slitting apparatus that cuts the travelling web and does not wet the web during stoppage in web travel.

Background of the Invention

[0002] In the papermaking industry, knives or water jets are commonly employed to cut through the traveling web or sheet. The knives and water jets are used in edge trimming, slicing, cross-cutting, and tail cutting applications within the papermaking machine. However, water jet cutters have rarely been used to as slitters in a re-winder machine where a wound web of paper is unwound, slit in longitudinal directions and re-wound into webs of reduced width.

[0003] One reason for a limited use of water jets to slit the web at the re-winder is due to the fact that the web travel is stopped when a new reel is loaded at the unwind section of the re-winder or the web is spliced. Portions of the paper adjacent the water jet can be seriously damaged if the paper is re-wetted by the water jet.

[0004] While one possible solution might be to turn the water jet off for every stoppage in web travel, this solution is not practical since the jets must be re-started causing a momentary web surface splash before full pressure is achieved. Furthermore, any movement of the web in the direction of web travel effected by changes in web tension while the water jet is off causes an interruption in the cut line in the web. An interruption of the cut line results in tearing of the paper web when the rolls are separated.

[0005] A water jet cutting head currently in use in the papermaking industry typically includes a base plate having a cover plate defining a chamber. The cover plate has one large upstream circular aperture through which air is drawn to hold the sheet against the cover plate. A second circular aperture is located downstream in the direction of sheet travel relative to the first circular aperture. A water jet is emitted through the second aperture to cut the sheet. Air is drawn through the first aperture and the second aperture by a hose contained in the chamber. The hose passes through the base plate to remove the air from the chamber and maintain a vacuum. While such a described water jet cutting head has good cutting performance characteristics, it is unsuitable as a slitter head for a re-winder.

[0006] A water jet cutting apparatus, as disclosed in U.S. patent 6,021,699 issued February 8, 2000 to Roman Caspar, was developed for cutting strip into the edge of a traveling web where an asymmetrical aperture pattern is utilized only on one side of the water jet to

discriminately support only that portion of the web to be further processed within the papermaking machine or the sheet processing machine while discarding the strip trimmed from the web. Such a water jet cutter would not function as a slitter on a re-winding machine because it would be subject to the potential wetting problems noted above.

[0007] Accordingly, there is a need to provide a water jet cutting device that can be utilized in the dry end of a papermaking machine and does not wet the web during temporary stoppages in web travel.

Summary of The Invention

[0008] The present invention relates to a water jet web slitting apparatus for slitting a web into a plurality of webs of smaller width. In particular, the present invention utilizes a series of water jet cutters mounted on a support beam traversing the width of the beam and supported from the beam by a support arm. The water jet cutters cut through the travelling web to cut the web into the plurality of smaller webs. The present invention utilizes a support plate structure with the water jet cutter that continues to support the web in engagement with the plate when the web is travelling over the plate or is in a stopped position relative to the plate.

[0009] The water jet cutter has a water jet nozzle which preferably continues to emit the water jet through a cutting aperture in the support plate. This jet continues whether or not the web is travelling across the support plate. In order to support the web and prevent it from fluttering or moving relative to the water jet and the support plate, the support plate has a working surface area in which a plurality of apertures are located. The apertures also surround the water jet cutting aperture. These apertures are referred to throughout the specification as suction apertures because a negative pressure or suction is applied through these apertures to pull the web against the suction apertures and against the working surface area of the support plate. As a result, the web is held against the support plate while the water jet passes through the support plate and the web thereby cutting the web and forming new cut edges for the smaller webs. In the event that the web stops its travel over the support plate, the web is held firmly in place against the support plate both upstream and downstream in the direction of web travel relative to the cutting aperture. Also, the web cut edges downstream from the water jet cut are held firmly against the working surface area of the support plate and are not in direct alignment with the water jet because the jet penetrates or blasts a hole through the web with a high speed jet of extremely small diameter. This jet continues to pass through the web without touching the web when the web remains stationary and does not re-wet the web.

[0010] Preferably the suction apertures are arranged in a symmetrical pattern surrounding the water jet cutting aperture both upstream and downstream in the di-

rection of web travel. The suction applied to the suction apertures may be chosen to cause the support plate to grab or hold the web against the plate upstream, downstream and on both sides of the water jet cutting aperture. Hence, the hole pattern arrangement of the present invention provides a uniform suction force about the cutting aperture preventing the cutting edges of the web and the web from fluttering relative to the working surface area.

[0011] The water jet web slitting apparatus, including the water jet of the present invention, may be utilized as a slitter on a re-winder machine where the web is to be slit into a plurality of webs and wound onto separate rolls. Further, because web travel is known to stop to permit separate rolls to be exchanged, the location of the cut is immaterial because it does not result in any damage to the web. For example, if the web is damaged by re-wetting, there is wasted web that has to be trimmed or discarded from the new separate rolls. The present invention is not subject to these problems.

[0012] In accordance with the present invention, the water jet web slitting apparatus comprises a plurality of water jet cutters. Each water jet cutter has a support plate having a working surface area against which the web is supported. The support plate has a cutting aperture passing through the working surface area and a predetermined number of suction apertures passing through the working surface area arranged in a pattern on both sides of the cutting aperture in a first direction of web travel. The cutter has a water jet nozzle located adjacent the cutting aperture for directing a water jet through the cutting aperture and away from the working surface area. The cutter has suction means for applying suction through the suction apertures to draw the web towards the suction apertures and into engagement with the working surface area whereby the web is supported by the support plate on upstream, downstream and both sides of the cutting aperture in the first direction of web travel. The suction applied by the suction means prevents fluttering movement of the web relative to the working surface area to permit the water jet passing through the cutting aperture to cut through the web to form cut edges and to prevent wetting of the web surface and cut edges notwithstanding whether the web is normally travelling in the first direction or is remaining stationary relative to the working surface area of the slitting apparatus.

[0013] It should be understood that the amount of suction applied to the suction apertures depends on the shape and size of the apertures which preferably are round. The cutting aperture is considerably smaller than the suction apertures because the dimension of the jet is relatively small and it is preferred that substantially no suction be applied through the cutting aperture. The water jet nozzle is preferably located closely adjacent the cutting aperture on the opposite side of the support plate from the web to block the cutting aperture preventing suction from being applied to the cutting aperture.

The smaller the cutting aperture, the better the jet cuts through the web and less are the risks of backslash occurring. The cutting aperture may have a diameter in the range of 0.05 to 3 mm.

[0014] The working area is that area defined around the suction apertures on the support plate and in-between the suction apertures. The working area may extend further beyond the perimeter as defined by the suction apertures by an amount which would be proportional to the amount of suction applied through the suction apertures. In accordance with the present invention, the support plate preferably has a section downstream from the cutting aperture and in line therewith to which suction is not applied. It is across this section that the cut edges of the web pass.

[0015] The suction may be applied to the suction apertures by means of hoses applied directly to the suction apertures or by having an enclosed chamber located behind the support plate in which the water jet nozzle is mounted and from which a suction hose is attached to either the rear surface or side surfaces of the support plate to create a negative pressure within the chamber to draw air in through the suction apertures.

[0016] Preferably, the suction aperture pattern comprises a series of six suction apertures, four of which are located immediately prior to the cutting aperture in the downstream direction of the travel of the web and two apertures located downstream relative to the cutting aperture. The suction apertures are preferably aligned on either side of the cutting aperture whereby at least the downstream suction apertures relative to the cutting apertures have a land area or longitudinal working surface section that is not interrupted by the pattern of the suction apertures. This prevents any suction being applied to the web cut edges as the web travels past the cutting aperture. Alternatively, it should be understood that the present invention provides a water jet cutter which may be placed either above or at any angle not more than 90 degrees from the vertical relative to the travel of web.

Brief Description of The Drawings

[0017] For a better understanding of the nature and objects of the present invention reference may be had to the accompanying diagrammatic drawings in which:

Figure 1 is a perspective view showing the water jet web slitting apparatus of the present invention adapted for slitting a web into a plurality of webs having smaller width by the use of the water jet cutter of the present invention;

Figure 2 is a side view of the water jet cutting apparatus of the present invention;

Figure 3 is a bottom view of the support plate utilized in the water jet cutting apparatus of the present invention; and

Figure 4 is a top view of the support plate chamber mechanism of the water jet cutting apparatus of the

present invention.

Detailed Description of The Drawings

[0018] Referring Figure 1, there is shown a water jet web slitting apparatus 10 having a support beam 12 and stands 14 for supporting the support beam 12. The support beam 12 spans across the width of the web 16. The support beam 12 includes a plurality of arms 18 which hold a water jet cutting apparatus or cutter generally shown at 20. It should be understood that the water jet cutting apparatus 20 include hoses and pneumatic controls (not shown) which will pass down the arms and across the beam so as to be supported away from the travelling web 16. In the present invention, the web travels in the first direction shown by arrow 22 and each of the cutters 20 slits the web 16 at slits or cut edges 24 so that the web 16 now has been cut into a plurality of separate webs 16a having a width which is less than the overall of the web 16.

[0019] It should be understood that this water jet web slitting apparatus 10 typically is utilized in a re-winder machine where a wound roll of paper is un-wound, slit in a longitudinal direction, and re-wound into webs of reduced width. The web 16 is slit by the water jet slitters 20 and the slits 24 become the new edges of each of the smaller webs 16a. The webs 16a are re-wound onto separate winding rolls (not shown). In the practice of the present invention, the web 16 normally travels in the direction of arrow 22 and is stopped from time to time to remove separate wound rolls from the downstream section of the re-winder.

[0020] Referring to Figures 2, 3 and 4, the construction of each of the water jet cutters 20 for slitting slits 24 in web 16 is shown. The water jet cutter 20 has a nozzle 28 located within a chamber 30. The nozzle 28 is mounted relative to a support plate 32 behind a working surface area 34. A water jet 36 pushes through the aperture of cutting aperture 38 in the working surface area 34. Cutting aperture 38 has a preferred diameter of 0.08 to 3 mm. The nozzle 28 is positioned closely adjacent the cutting aperture to block the cutting aperture and prevent or limit suction being applied through cutting aperture 38.

[0021] Referring to Figure 3, the working surface area 34 is shown within the perimeter 40 in the dotted lines and surrounds the cutting aperture 38. Also located within the perimeter 40 of the working surface area 34 are a series of suction apertures 42. The suction apertures 42 are aligned in a symmetrical pattern of two rows of three apertures in the direction 22 of web travel. The suction apertures 42 are circular in shape and have a preferred diameter of 20 mm, which is considerably larger than the smaller diameter of cutting aperture 38. Each row of three suction apertures 42 is aligned in the direction 22 of web travel on opposite sides of the water jet cutting aperture 38. Furthermore, four suction apertures 42 are located upstream of the water jet cutting aperture

38 and two suction apertures 42 are located downstream in the direction 22 of web travel relative to the water jet cutting aperture 38. The suction apertures 42 hold the web 16 against the working surface area 34 to permit the water jet 36 to cut through the web 16.

[0022] The shape of the suction apertures 32 may vary from a circular shape, however for the purposes of the present invention circular apertures are preferred because cutting these holes is less costly and the suction applied across the aperture is relatively uniform. Two additional apertures 42 are positioned upstream than downstream of the water jet cutting aperture 38 insuring the working surface area 34 to grip or draw the web 16 against this working surface area 34 prior to cutting through the web.

[0023] The area 60 immediately downstream of the cutting aperture 38 between the suction apertures 42 provides a land of longitudinal working surface section that is not interrupted by the suction aperture pattern such that no suction is applied to the cut edges or slits 24 of the web 16a.

[0024] The apparatus 10 is further provided with a suction hose 70 shown in Figure 4 which comes in through the rear wall or top wall 72 of the chamber 30 to draw or create a vacuum or negative pressure area within chamber 30 so that suction is drawn through the suction apertures 42.

[0025] The support plate 32 is separated from a top wall 72 by a front wall 71, side walls 74 and angled top or back wall 76. The side walls 74 preferably angle outwardly or diverge from each other as the side walls 74 extend away from the support plate 32 towards the top wall 72. Thus as the sheets or web 16 widens out, it passes smoothly underneath the cutting heads without catching. The back wall 76 is angled downwardly into the web as it extends from the top wall 72 to the support plate 32. The sloping back wall 76 improves air flow over the top wall 72 of air moving with the traveling web 16 as the web is drawn over support plate 32. The improved air flow is less turbulent reducing "low pressure" areas where dust particles might first collect.

[0026] The water jet cutter 20 further includes conduits 46 passing through the neck 48 and upper body 50 of the cutter for connection with the arms 18 of the beam 12.

[0027] It should be understood that the arms 18 of the beam 12 may be adjusted across the beam to adjust the width of the slots or the webs being cut from the master web 16. However, it is not a feature of the present invention that this adjustment is a continuous adjustment that occurs during the web cutting or slitting process. On the other hand, the position of the cutters 20 are adjusted prior to the cutting operation and remain in that position during the cutting operation for a given web 16 to be slit into smaller webs 16a.

[0028] It should be understood that alternative embodiments of the present invention may be readily apparent to a person skilled in the art in view of the above

description for the preferred embodiments of this invention. Accordingly, the scope of the present invention should not be limited to the teachings of the preferred embodiments and should be limited to the scope of the claims that follow.

Claims

1. A water jet web slitting apparatus (10) for slitting a web (16) normally travelling in a first direction (22) relative to the slitting apparatus (10) and capable of remaining stationary relative to the slitting apparatus (10), the apparatus (10) characterized by:

a) a support plate (32) having a working surface area (34) against which the web (16) is supported, the support plate (32) having a cutting aperture (38) passing through the working surface area (34) and a predetermined number of suction apertures (42) passing through the working surface area (34) arranged in a pattern on both sides of the cutting aperture (38) in the first direction (22) of web travel;

b) a water jet nozzle (28) located adjacent the cutting aperture (38) for directing a water jet through the cutting aperture (38) and away from the working surface area (34); and,

c) suction means (70) for applying suction through the suction apertures (42) to draw the web (16) towards the suction apertures (42) and into engagement with the working surface area (34) whereby the web (16) is supported by the support plate (32) on upstream, downstream and on both sides of the cutting aperture (38) in the first direction (22) of web travel, and the suction applied by the suction means (70) preventing fluttering movement of the web (16) relative to the working surface area (34) to permit the water jet passing through the cutting aperture (38) to cut through the web (16) to form cut edges (24) and to prevent wetting of the web surface and cut edges (24) notwithstanding whether the web (16) is normally travelling in the first direction (22) or is remaining stationary relative to the working surface area (34) of the slitting apparatus (10).

2. The water jet web slitting apparatus (10) of claim 1 further **characterized in that** the pattern of suction apertures (42) is uniform and substantially in a symmetrical pattern providing substantially uniform suction force on the web (16) over the working surface area (34) and around the cutting aperture (38).

3. The water jet web slitting apparatus (10) of claim 1 further **characterized in that** the working surface area (34) has a longitudinal working surface section

(60) downstream from the cutting aperture (38) in the first direction (22) of web travel whereby limited suction is applied between the web cut edges (24).

4. The water jet web slitting apparatus (10) of claim 1 further **characterized in that** the suction apertures (42) are considerably larger than the water jet cutting aperture (38).

5. A water jet web slitting apparatus (10) for slitting a web (16) normally travelling in a first direction (22) relative to the slitting apparatus (10) and capable of remaining stationary relative to the slitting apparatus (10), the apparatus (10) **characterized by** :

a) a support plate (32) having a working surface area (34) against which the web (16) is supported;

b) the support plate (32) having a cutting aperture (38) passing through the working surface area (34) whereby the web (16) is supported by the support plate (32) on upstream, downstream and on both sides of the cutting aperture (38) in the first direction (22) of web travel;

c) a water jet nozzle (28) located adjacent the cutting aperture (38) for directing a water jet through the cutting aperture (38) and away from the working surface area (34) and the water jet nozzle (28) substantially blocking the cutting aperture (38) save for the emission of the water jet;

d) the support plate (32) having a predetermined number of suction apertures (42) passing through the working surface area (34) and arranged in a pattern across the working surface area (34) that surrounds the cutting aperture (38); and,

f) suction means (70) for applying suction through the suction apertures (42) to draw the web (16) towards the suction apertures (42) and into engagement with the working surface area (34), and the suction applied by the suction means (70) preventing fluttering movement of the web (16) relative to the working surface area (34) to permit the water jet passing through the cutting aperture (38) to cut through the web (16) to form cut edges (24) and to prevent wetting of the web (16) and cut edges (24) notwithstanding whether the web (16) is normally travelling in the first direction (22) or is remaining stationary relative to the working surface area (34) of the slitting apparatus (10).

6. The water jet web slitting apparatus (10) of claim 5 further **characterized in that** the pattern of suction apertures (42) is a symmetrical pattern providing substantially uniform suction force on the web (16) over the working surface area (34) and around the

cutting aperture (38).

7. The water jet web slitting apparatus (10) of claim 6 further **characterized in that** the working surface area (34) has a longitudinal working surface section (60) downstream from the cutting aperture (38) in the first direction (22) of web travel whereby no suction is applied between the web cut edges (24). 5
8. The water jet web slitting apparatus (10) of claim 6 further **characterized in that** the suction apertures (42) have a diameter that is considerably larger than the water jet cutting aperture (38). 10
9. The water jet web slitting apparatus (10) of claim 6 further **characterized in that** the working surface area (34) has a perimeter (40) within which the web (16) is supported and the pattern of suction apertures (42) extends outwardly from the cutting aperture (38) to the perimeter (40) of the working surface area (34). 15 20
10. A water jet web slitting apparatus (10) for slitting a web (16) normally travelling relative to the slitting apparatus (10) and capable of remaining stationary relative to the slitting apparatus (10) into a plurality of webs (16a) of smaller width, **characterized by:** 25

a support beam (12) traversing the width of the web (16); 30
 a plurality of support arms (18) carrying a water jet cutter (20) and mounted along the support beam (12) to define the width of the smaller webs (16a) to be cut; 35
 the water jet cutter (20) comprising:

- a) a support plate (32) having a working surface area (34) against which the web (16) is supported, the support plate (32) having a cutting aperture (38) passing through the working surface area (34) and a predetermined number of suction apertures (42) passing through the working surface area (34) arranged in a pattern on both sides of the cutting aperture (38) in the first direction (22) of web travel; 40
- b) a water jet nozzle (28) located adjacent the cutting aperture (38) for directing a water jet through the cutting aperture (38) and away from the working surface area (34); and, 45
- c) suction means (70) for applying suction through the suction apertures (42) to draw the web (16) towards the suction apertures (42) and into engagement with the working surface area (34) whereby the web (16) is supported by the support plate (32) on up- 50 55

stream, downstream and on both sides of the cutting aperture (38) in the first direction (22) of web travel, and the suction applied by the suction means (70) preventing fluttering movement of the web (16) relative to the working surface area (34) to permit the water jet passing through the cutting aperture (38) to cut through the web (16) to form cut edges (24) and to prevent wetting of the web surface and cut edges (24) notwithstanding whether the web (16) is normally travelling in the first direction (22) or is remaining stationary relative to the working surface area (34) of the slitting apparatus (10).

11. The water jet web slitting apparatus (10) of claim 10 further **characterized in that** the pattern of suction apertures (42) is uniform and substantially in a symmetrical pattern providing substantially uniform suction force on the web (16) over the working surface area (34) and around the cutting aperture (38).
12. The water jet web slitting apparatus (10) of claim 11 further **characterized in that** the working surface area (34) has a longitudinal working surface section (60) downstream from the cutting aperture (38) in the first direction (22) of web travel whereby no suction is applied between the web cut edges (24).
13. The water jet web slitting apparatus (10) of claim 12 further **characterized in that** the suction apertures (42) have a diameter that is considerably larger than the water jet cutting aperture (38).
14. The water jet web slitting apparatus (10) of claim 10 further **characterized in that** the water jet nozzle (28) substantially blocks the cutting aperture (38) save for continuous emission of the water jet.
15. The water jet web slitting apparatus (10) of claim 1 further **characterized in that** the support plate (32) has a front wall (71), two side walls (74), a back wall (76) and a top wall defining a chamber (30) into which suction is applied to draw a negative pressure through the suction apertures (42); and the back wall (76) sloping outwardly away from the top wall to the support plate (32) in the first direction (22) of web travel.
16. The water jet web slitting apparatus (10) of claim 5 further **characterized in that** the support plate (32) has a front wall (71), two side walls (74), a back wall (76) and a top wall defining a chamber (30) into which suction is applied to draw a negative pressure through the suction apertures (42); and the back wall (76) sloping outwardly away from the top wall to the support plate (32) in the first direction (22) of

web travel.

17. The water jet web slitting apparatus (10) of claim 10 further **characterized in that** the support plate (32) has a front wall (71), two side walls (74), a back wall (76) and a top wall defining a chamber (30) into which suction is applied to draw a negative pressure through the suction apertures (42); and the back wall (76) sloping outwardly away from the top wall to the support plate (32) in the first direction (22) of web travel.

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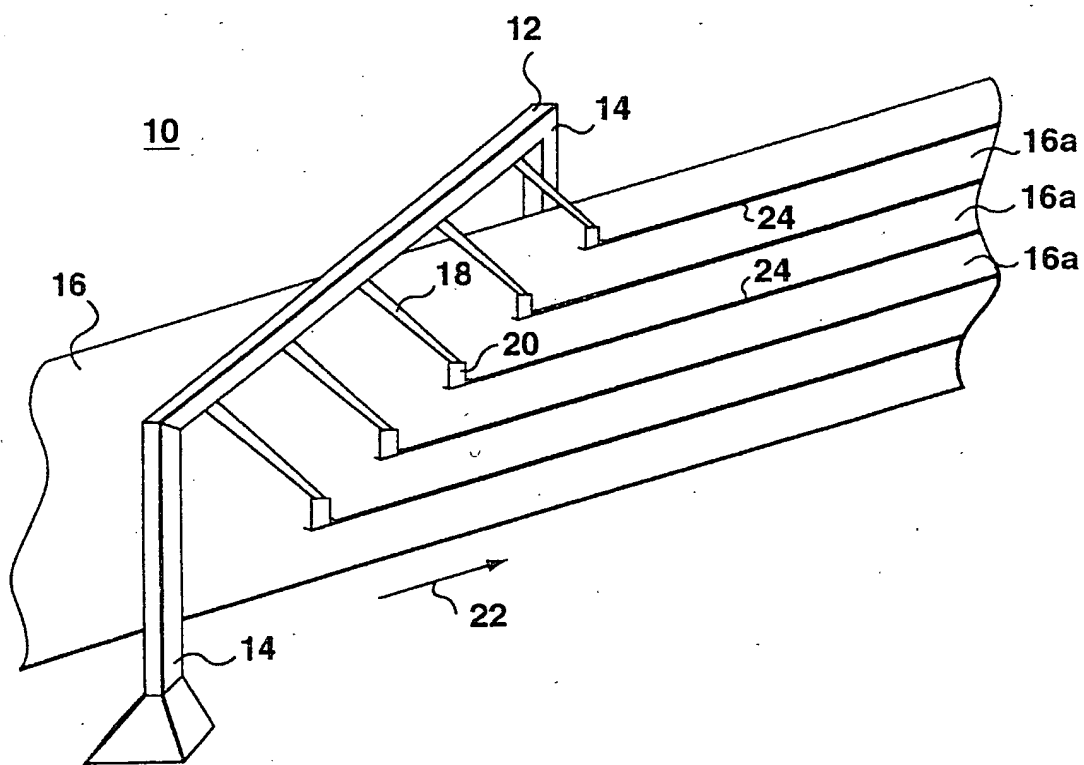


FIG. 1

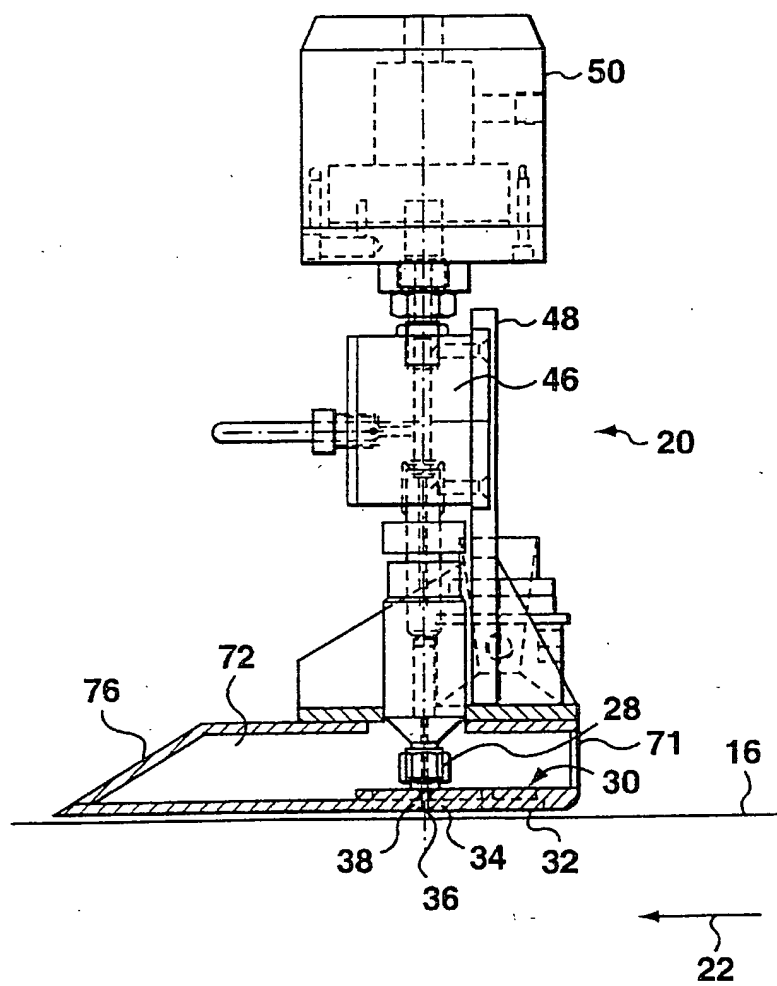


FIG. 2

